Thompson, Owen

From:	Robert Rule [Bob@demaximis.com]
Sent:	Friday, June 14, 2013 12:48 PM
To:	Thompson, Owen; William Earle
Cc:	Gerard Caron; Wayne Reiber; Joseph Heimbuch; Tom Steib; Felitti, Peter; Rick Mason; Ralph Cascarilla
Subject:	Fields Brook Action Group Comments to Detrex DNAPL Report
Attachments:	Comments_DetrexDNAPLRecReport.pdf

Hello Owen,

Thank you for allowing the FBAG to review and comment on the Detrex DNAPL Recoverability Report. Attached are the FBAG specific comments on the report. Without going into the details of the comments in this electronic mail, the FBAG believes that the conclusions reached by Detrex and its consultant are incorrect based upon the data presented. Additionally, the recommendation that he DNAPL recovery system be suspended is unfounded. The Source Control Operable Unit Record of decision (ROD) is appropriate for this site and aggressive DNAPL removal, as required by the ROD, should be implemented.

If you have any questions, please contact me.

Thank you

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FBAG Comments on DNAPL Recoverability Evaluation Report
Dated April 12, 2013
Fields Brook Superfund Site, Ashtabula, Ohio

Summary

Detrex submitted a report to USEPA evaluating the results of DNAPL recoverability testing that was conducted at the Detrex facility (URS, 2013)[1]. The scope of the field procedures included DNAPL recovery well installation, DNAPL and groundwater sampling and gauging, and DNAPL recoverability testing using four different procedures. Based on the results of the DNAPL recoverability testing, Detrex concluded that the "use of induced high vacuum extraction on the DNAPL recovery wells is not an effective means to enhance DNAPL removal from the subsurface" while neglecting the fact that significant volumes of DNAPL were recovered by all methods tested and significant mobile product remains on this site. The report further recommended that "the existing DNAPL recovery well system be suspended, and then decommissioned."

The Fields Brook Action Group (FBAG) strongly disagrees with the report's conclusions and recommendations. The URS Report does not characterize the magnitude of the DNAPL problem at the Site, minimizes the volume of DNAPL recovered during the test, and reaches incorrect conclusions about the long-term recoverability of DNAPL at the Site. Proper interpretation of the study results, consistent with US guidance (US EPA, 2009),[2] indicates that significant quantities of mobile DNAPL are present at the Site and that DNAPL continues to migrate in the subsurface. In addition, the pilot test results demonstrate that DNAPL can be recovered by an effectively designed system at the Site (*e.g.*, DNAPL was being recovered at a relatively constant rate of 4 gallons per day, when the testing was prematurely terminated). Given that DNAPL is a Principal Threat Waste, it needs to be removed and treated from the subsurface, consistent with US EPA guidance (US EPA, 1991).[3] As we have previously indicated (Gradient, 2011)[4], the failure to implement the ROD-approved remedy (of DNAPL removal and treatment) will result in migration of DNAPL beyond the Detrex Facility with risk of recontamination of down gradient areas, such as the DS Tributary, and ultimately Fields Brook. Finally, the Detrex recommendation to abandon up to 150,000 gallons of DNAPL in the sub-surface is unprecedented.

The following section presents a detailed discussion of the FBAG's comments.

Comments

1. **A significant source of <u>mobile</u> DNAPL, estimated to be up to 150,000 gallons, continues to be present at the Site, 16 years after the issuance of the 1997 Source Control Record of Decision (ROD).**

   DNAPL thickness measurements recorded during the Detrex DNAPL recovery testing indicates that the DNAPL source area on the Detrex property continues to be significant, both in extent and volume (see Figure 1). DNAPL thicknesses greater than 5 feet were reported in a total of 17

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[1] URS. 2013. "DNAPL Recoverability Evaluation Report, Detrex RD/RA Source Control Area, Detrex Facility, Ashtabula, Ohio" April 12.
[2] US EPA. 2009. "Ground Water Issue: Assessment and Delineation of DNAPL Source Zones at Hazardous Waste Sites." Office of Research and Development, EPA/600/R-09/119. 20p., September.
[3] US EPA. 1991. "A Guide to Principal Threat and Low Level Threat Wastes." National Technical Information Service (NTIS) Publication 9380.3-06FS ; NTIS PB92-963345. November.
[4] Gradient. 2011. "FBAG Comments on Proposed ESD for Detrex Corporation Source Area (OU5) Fields Brook Superfund Site, Ashtabula, Ohio."

monitoring wells (Figure 1) – an indication of the significant volume of mobile DNAPL present in the subsurface. US EPA DNAPL guidance (2009) states that:

> "…residual DNAPL will not enter monitoring wells, implying that the accumulation of DNAPL in a well indicates the presence of pooled DNAPL in the formation"
>
> "DNAPL obtained from the bottom of a monitoring well or as an emulsion from a pumped water sample is conclusive evidence of DNAPL presence (pooled DNAPL)"

Consistent with US EPA guidance, the presence of several feet of DNAPL in monitoring and/or recovery wells at the Site is irrefutable and clear evidence that DNAPL pools are present at the Site. The continued migration of DNAPL into multiple recovery wells over a large area, provides further indication that DNAPL at the Site is mobile and does not exhibit "limited vertical and lateral mobility" as previously asserted by URS (2012).[5]

Further, based on recent measurements and observations of DNAPL recorded by Detrex (URS, 2012; URS, 2013), the volume of mobile DNAPL in the source area is estimated to range up to 150,000 gallons[6], which is on the same order of magnitude as the original DNAPL volume estimate for the Detrex property and another strong indicator of the magnitude of the DNAPL source area on the Detrex property.

2. **A substantial DNAPL driving head continues to be present at the Site. If left unaddressed, DNAPL could be intercepted and transported *via* preferential pathways (*e.g.*, building footing, sewers, electrical utilities and geologic interfaces) – a phenomenon that has previously resulted in recontamination of the DS Tributary and Fields Brook. DNAPL subsurface migration can only be addressed by removal and treatment of the DNAPL in the Lagoon area, as required by the SCOU ROD.**

Several feet of DNAPL was measured in more than 20 monitoring wells on the Detrex property (Figure 1). The maximum thickness of DNAPL recorded was approximately 14 feet (at MP-15B), with the DNAPL surface in the monitoring well being only 6 feet below ground surface (ft-bgs) (see Figure 2, which is Figure 2.4 in the URS report). Even though DNAPL thicknesses can be somewhat exaggerated in monitoring wells, the significant DNAPL accumulation noted in the monitoring wells demonstrates that:

- There is a significant driving head of DNAPL in the formation and evidence of transmissivity that resulted in 14 feet of DNAPL accumulating in well MP-15B. In addition, for DNAPL to rise to 6 ft-bgs in a monitoring well would require the DNAPL zone to be considerably thicker and for DNAPL to be present at much shallower depths than depicted in Figure 2.4 of the URS report (Figure 2).
- Given the amount of DNAPL present in the subsurface in the Detrex Lagoon area and at relatively shallow depths, DNAPL could readily flow into other preferential pathways (*e.g.*, building foundations, utilities) and then spread laterally. This mechanism has previously resulted in DNAPL migrations and observations beyond the Detrex facility towards the DS Tributary and Fields Brook. Pooled DNAPL could also be feeding other preferential migration pathways, such as sand seems in the lacustrine clay.

[5] URS. 2012. Letter to W.O. Thompson (US EPA) re: Results of Additional Soil Borings Investigation Detrex Source Control Area – Fields Brook Superfund Site. 4p., May 24.

[6] The volume DNAPL was conservatively estimated based on the approximate area and thickness of the DNAPL zone, as observed in boring logs and measured in monitoring wells on the Detrex property (URS, 2012; URS, 2013). Consistent with the presence of pooled/mobile DNAPL, the DNAPL saturation was assumed to range from 30% to 80% (USEPA, 1992; USEPA, 2009). In addition, it was conservatively assumed that the thickness of DNAPL measured in monitoring wells was exaggerated by a factor of 2 to 5.

Where large quantities of DNAPL are present in the subsurface, as is the case here, US EPA's policy for Principal Threat Waste requires that aggressive measures be undertaken to excavate, flush, extract or otherwise remove DNAPL (USEPA, 1991). Given the size and potential mobility of the DNAPL plume at the Detrex facility, Detrex should be required to implement the aggressive ROD-required remedy of removal and treatment.

3. **The DNAPL recoverability pilot testing results indicate that significant DNAPL recovery rates were achieved and could be potentially improved and sustained with a properly designed full-scale system.**

   - *DNAPL Recovery Rate*: Detrex's characterization of the recoverability testing findings is misleading, given that the highest reported DNAPL recovery rate was 28.8 gallons per day (gpd). Furthermore, the average DNAPL recovery rates ranged from 17 to 27.5 gpd for procedures 2 through 4. These measured DNAPL recovery rates are appreciable and would result in the recovery of thousands of gallons of DNAPL per year from the pilot wells alone, if sustained (see below for further discussion regarding sustainability). Further, the average DNAPL recovery rate measured for each procedure is biased low, since in most of the tests, the applied vacuum was increased during the course of the test, which resulted in a decrease in DNAPL recovery rates. Thus, if the recovery wells were adjusted and operated at optimal vacuum, it is likely that higher DNAPL recovery rates would have been achieved.
   - *Sustainability of DNAPL Recovery Rates*: The FBAG also disagrees with Detrex's conclusion regarding the sustainability of DNAPL recovery at well RW-17.
     - The URS report concluded that the DNAPL recovery rate linearly decreased during the test (Figure 3.10 of the URS, 2013 report) – implying that the DNAPL recovery rate would quickly achieve zero. This interpretation of the DNAPL recovery data is fundamentally flawed and completely disregards how contaminants (including DNAPL) behave in the subsurface. It is well documented that mass removal rates at remedial systems follow a non-linear, typically exponential decay behavior, and not the linear behavior assumed by URS.
     - The results of the DNAPL recoverability test performed at RW-17 showed that the measured DNAPL recovery rate at the end of the test was approximately 4.2 gpd (*i.e.*, a significant DNAPL quantity), and fitting a non-linear curve through the data set indicates that the 4 gpd DNAPL recovery rate may have been sustainable for a considerable period of time (Figure 3), had operations continued.
     - The test was not discontinued due to poor DNAPL recovery at the well, but rather, operational issues with the piston pumps, which essentially compromised the test protocol and prevented sustained operation under the preferred dual pumping configuration. FBAG agrees that the method that led to cessation of the test was suboptimal and suggests that Detrex examine the nature of the pump failures (a root cause analysis) to understand why both of the pumps important to sustaining operating conditions failed in such a short period of time. Piston pumps are not typically applied to service conditions where grit and other materials are present, as they can be subjected to premature wear and failure. There are a number of alternative pump styles in the positive displacement pump class of equipment that could have been used in this application with better operating reliability.

Overall, the results of the DNAPL recoverability testing conducted at the Detrex facility show that if the DNAPL recovery system is operated with the appropriate equipment and under the right conditions (vacuum, groundwater extraction, *etc.*), substantial DNAPL recovery rates can be achieved and sustained.

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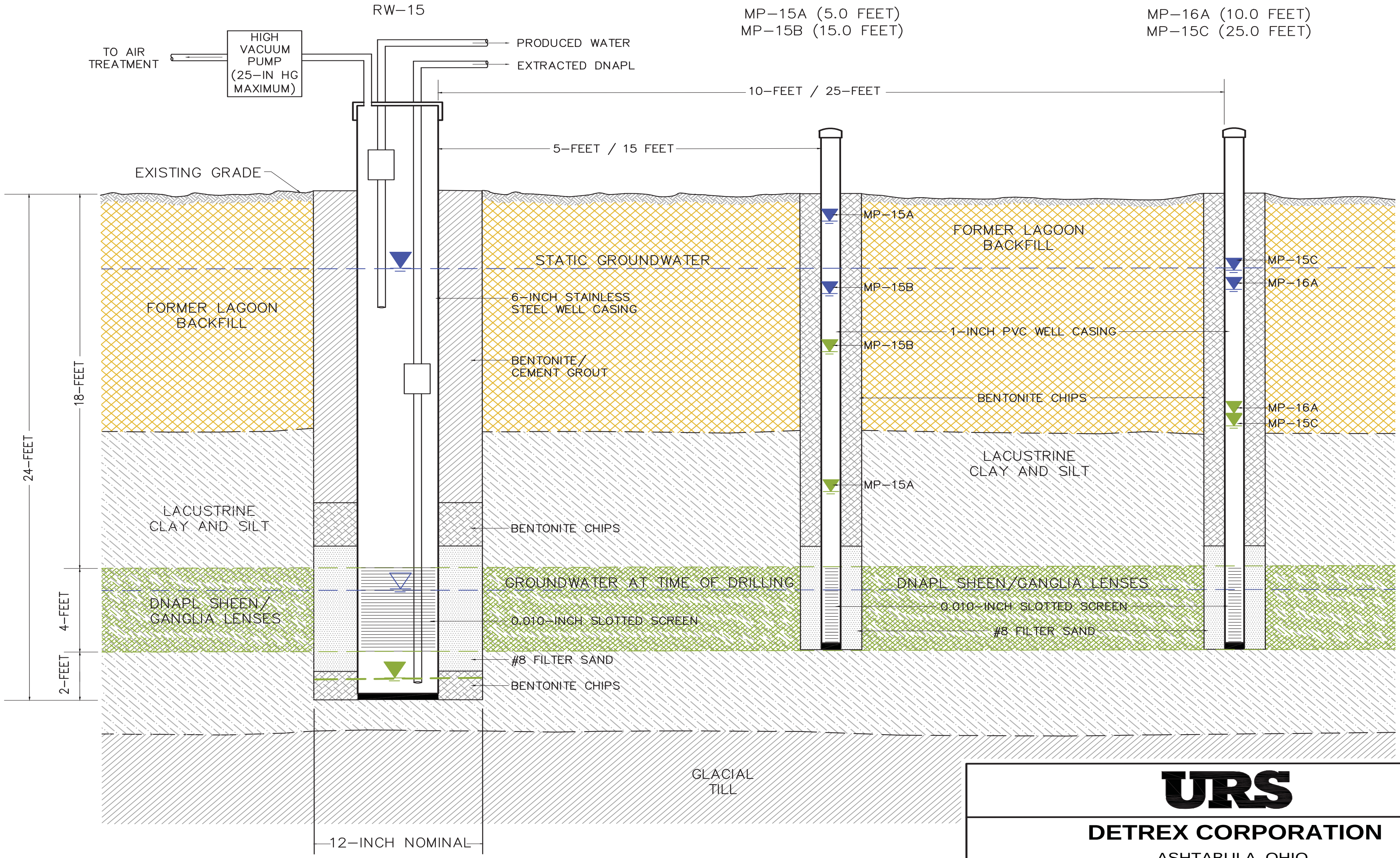
Detrex DNAPL Thickness Contours

FIGURE 1

Fields Brook Superfund Site - Ashtabula, Ohio

Date: 6/12/2013

File Path: G:\Projects\206035 Fields Brook\Graphics\105\208026-105 11a_DetrexDNAPLthick.mxd



0 3 6

VERTICAL SCALE 1" = 6'

LEGEND

NOTES:

1. GENERALIZED LITHOLOGY FROM RECOVERY WELL RW-15 / GP-58
2. FIGURE ILLUSTRATES PROCEDURE #2 TESTING CONDITIONS

WATER LEVEL AT TIME OF DRILLING

STATIC WATER LEVEL (3/14/13)

STATIC DNAPL LEVEL (3/14/13)

URS

DETREX CORPORATION

ASHTABULA, OHIO

TYPICAL NORTHERN DNAPL AREA - RECOVERY WELL CROSS SECTION

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
AMH	MLS	13816274	04/12/13	2.4

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Typical Northern DNAPL Area - Recovery Well Cross Section

Ashtabula, Ohio

FIGURE 2

Date: 05/22/2013

K:\Projects\D\Detrex\13816274\DWGs\Figures\Figure 2.4 - North Extraction Well Detail Cross Section.dwg User: anton_heitger Apr 12, 2013 - 2:44pm

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Figure 3
DNAPL Recovery at Well RW-17